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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/376,063	08/17/1999	SEIJI ANDOH	OKI-226	5971

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EXAMINER
DATSKOVSKIY, MICHAEL V

ART UNIT	PAPER NUMBER
2835	

DATE MAILED: 09/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/376,063	ANDOH, SEIJI	
	Examiner	Art Unit	
	Michael Datskovsky	2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 August 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *20,22,24-29 and 31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *20,22,24-29 and 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicant's arguments filed 08/26/2002 have been fully considered but regarding to the rejection under 35 USC § 103(a) they are not persuasive. Examiner directs applicant attention to the fact that nowhere in the claims applicant has claimed an intermediate area between the central bumps area and the peripheral bumps area as "distinct" (No matter how indefinite such a term would be). Included is a copy of a Fig.1 from reference by Katchmar with a red marked area considered by the examiner as "an intermediated area" without any solder bumps. Katchmar teaches BGA semiconductor package having three separate bottom areas: central with solder balls (or unitary solder body) for cooling, peripheral with solder balls for signal lines and an intermediate area in-between them without solder balls. All applicant's arguments about distinctions between a proposed invention and submitted references concerning differences of sizes of distances between solder bumps (including a distance small enough to allow solder bumps to melt together), between central and peripheral areas of said bumps and certain ratios between said sizes were addressed by the examiner in previous office action as being unable to contribute to the patentability of the instant application. Examiner has also to point out that the method of forming the device (in this case it is not even about the claimed device but about a hypothetical device which could be formed using as a part of it the claimed device) is not germane to the issue of patentability of the device itself. As it was already said in the previous office actions, BGA semiconductor packages having three separate bottom areas: central with solder

balls for cooling, peripheral with solder balls for signal lines and an intermediate area in-between them without solder balls are well known in the art. There are several prior art references (Bond et al, Rostoker et al, Haley, Barrow and Shim et al) already cited in the previous office actions, as well as provided below list of newly discovered references, which clearly teach such a structure.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 20, 22 and 24-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katchmar.

Katchmar teaches a semiconductor device, figs 1-5, comprising: a substrate 12 having a main surface 14 and a back surface 16, wherein said back surface 16 has a central area 32, an intermediate area without any solder bumps surrounding said central area 32 (see included red marked by the examiner copy of FIG.5), and a peripheral area surrounding said intermediate area; a semiconductor chip 18 formed on said main surface; a first bump unit formed of solder bumps 40. Fig. 5 disposed at a first distance apart from each other, and located in said central area of said back surface, wherein

said first bump unit radiates heat from said semiconductor device; a second bump unit formed of solder bumps 24 disposed at a second distance apart from each other and located in said peripheral area of said back surface, wherein said second bump unit transmits signals (col.6, lines 50-53), wherein the second bump unit is greater in quantity of solder balls that the first bump unit, and said solder balls are spherical in shape. Katchmar teaches furthermore a second distance between signals bumps being greater than a first distance between heat transferring bumps (col.7, lines 39-47). Also in the embodiment shown in figs.1-4 Katchmar teaches that said central area could be thermally connected to a circuit board by a solid melted solder mass 26.

Katchmar does not teach that said second distance is less than a width of the intermediate area, and said melted solder mass (unitary body) can be made by locating bumps of the first bump unit sufficiently closed to each other that upon the application of the heat treatment to the device, the bumps of the first bump unit fuse into a unitary body; and that the first distance is about 1 to 1.4 times the diameter of the bumps of the first bump unit, and the second distance is about 1.6 to 1.7 times the diameter of the bumps of the second bump unit (claim 31). It would have been an obvious matter of design choice to make the first distance sufficiently small that upon the application of the heat treatment to the device, the bumps of the first bump unit fuse into a unitary body; or make it about 1 to 1.4 times the diameter of the bumps of the first bump unit, and the second distance about 1.6 to 1.7 times the diameter of the bumps of the second bump, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of

ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955). Applicant has not shown that these particular ranges of sizes are critical by showing that the claimed range achieves unexpected results relative to the prior art range. (In re Woodruff, 919 F. 2d 1575, 16 USPQ2d 1934, Fed. Cir. 1990). To establish unexpected results over a claimed range, applicant should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. (In re Hill, 128 USPQ 197 CCPA 1960).

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Huang et al (US Patent 6,359,341); Nakashima (US Patent 5,640,047); Shim et al (US Patent 5,864,470); Kim (US Patent 6,268,568) and Koike (Japan Patent JP409321188A).

Conclusion

5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Datskovsky whose telephone number is (703) 306-4535. The examiner can normally be reached on Mn - Fry 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren E. Schuberg can be reached on (703) 308-4815. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

M.D.

September 4, 2002

DARREN SCHUBERG
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

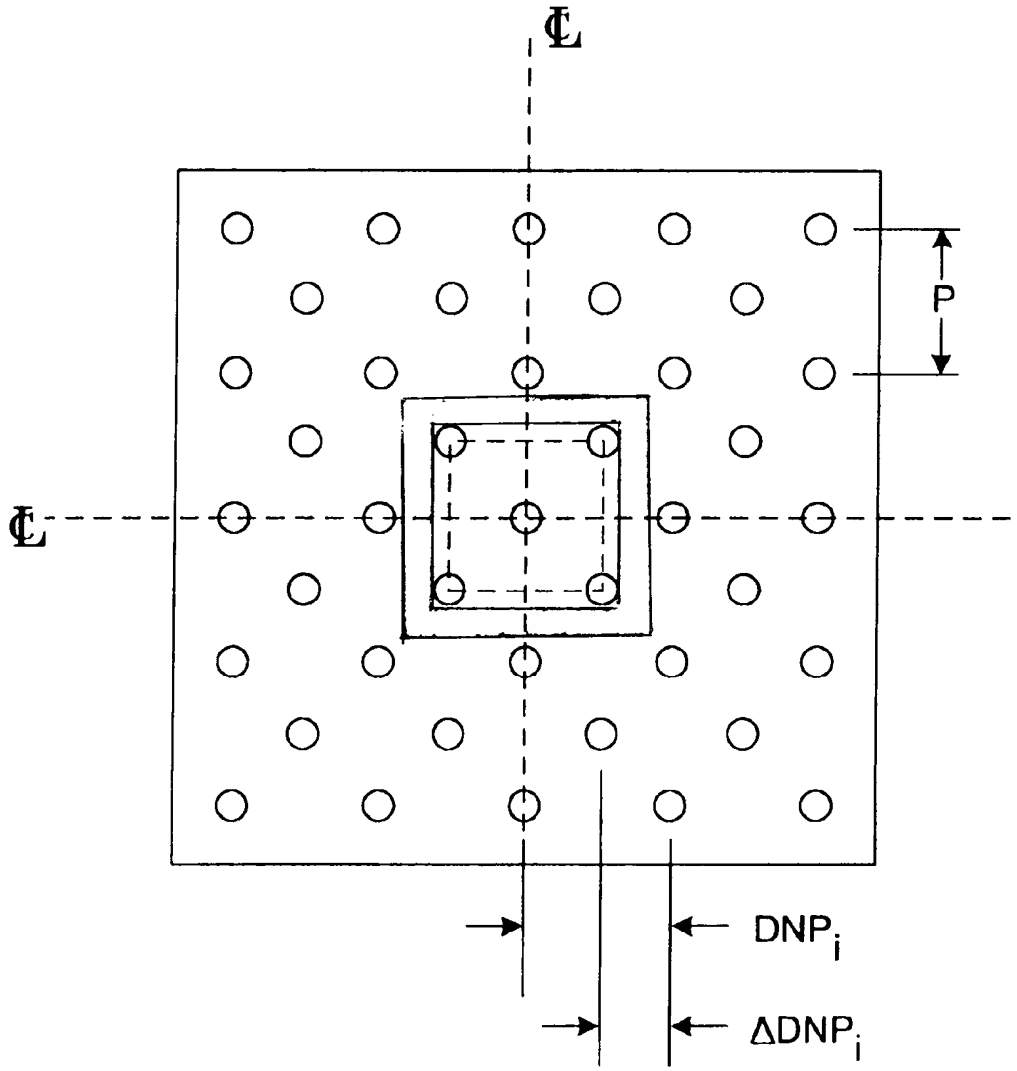

Fig. 1